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MEMORANDUM

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SUBJECT: MONITORING RESULTS FROM A BEDDED TARPED, HIGH BARRIER FILM, SHALLOW INJECTION METHYL BROMIDE APPLICATION IN SAN LUIS OBISPO COUNTY

Introduction—Methyl bromide is widely used as a preplant soil fumigant for control of nematodes, fungi, diseases, and weeds. The Department of Pesticide Regulation (DPR) and county agricultural commissioners have implemented permit conditions, including buffer zones, to mitigate unacceptable methyl bromide exposure (greater than 0.21 parts per million; 24-hour time-weighted average). The buffer zone distances for this method have been determined from data received and evaluated by DPR to date. Additional monitoring was made to test and evaluate the effectiveness of the buffer zone distances.

Materials and Methods—The field monitored was treated with methyl bromide by a shallow bedded tarped application method on October 6, 1998. In this method the beds are formed prior to application. A methyl bromide/chloropicrin mixture is injected into the bed at a depth of six inches and immediately covered with a high density polyethylene (high barrier) tarpaulin and reshaped with the application rig.

The 7-foot wide tarpaulin covered the top and sides of the bed, the edges were buried at the base of the beds with the application rig. The beds were 4 feet wide with a 5½-foot spacing. The field was located in Oceano, San Luis Obispo county.

The application site consisted of a 4.75-acre portion of a 9-acre field. A two acre portion of a field on the south border was treated with methyl bromide two days prior to the application. The buffer zone for this application was 100 feet based on a method 9.1 application. The application rate was 275 pounds per acre of formulated product, 75 percent methyl bromide 25 percent chloropicrin. Application took approximately 7 ½ hours.

Ambient air samples were collected at 15 locations using activated charcoal tubes (SKC #226-38-02) and air samplers (SKC #226-38-02) calibrated at 15 milliliters per minute. Eight samplers were located approximately 30 feet, six at 100 and one at 165 feet from the treatment edge. Table 1 and Figure 1 indicate the position of each sampler. Samples were collected for four sampling periods beginning at 8:45 a.m., with the start of fumigation at 8:55 a.m. Samples were collected for one 11-hour followed by three 12-hour periods, for a total of 47 hours.

The California Department of Food and Agriculture's Center for Analytical Chemistry conducted the laboratory analyses. These samples were extracted with ethyl acetate and analyzed using a gas chromatograph with an electron capture detector.

The weather was mostly sunny and clear skies with some high clouds in the afternoon. Temperatures ranged from 45 to 80 degrees Fahrenheit. The wind was generally from the west-southwest at 5 to 10 miles per hour from the late mornings to early evening, and from the northeast at 1 to 5 miles-per-hour at night (Figure 1).

Results—Off-site methyl bromide air concentrations exceeded DPR's target level of 0.21 parts per million (24-hour time weighted average) at the 100 foot resident buffer zone. The highest 24-hour time weighted average concentration at 100 feet was 0.35 parts per million at sampler 10. Samplers 9 and 11 also exceeded the target level at 0.27 and 0.21 parts per million. The highest 24-hour time weighted average concentration at 30 feet was 0.45 parts per million at sampler 1. The highest concentrations during a monitoring period were measured during interval 2, from 7:45 p.m. to 7:45 a.m. (Table 1 & Figure 1).

Air concentrations at the mobile home park located 195 feet from the north edge of the field were below the target level. Sampler 15— 30 feet from the mobile home park and 165 feet from the field, measured 0.12 parts per million. Samplers 11 and 12, 120 feet from the mobile home park and 100 feet from the field, had concentrations of 0.21 and 0.078 parts per million respectively. The air concentrations at the house 150 feet to the south of the field may have exceeded the target level. A sampler was not placed at the house, modeling of the data is required to estimate the air concentrations at the house.

Although methyl bromide air concentrations exceeded the target level, revised permit conditions, dated October 9, 1998, extend the residential buffer zone for this application from 100 to 450 feet (Enforcement Letter ENF 98-041).

Please contact either of us if you have any questions.

Table 1. Ambient methyl bromide air concentrations.

		Methyl Bromide (ppm) for each sampling period					
		Interval 1	Interval 2	Interval 3	Interval 4	Intervals 1&2	Intervals 2&3
Site	Distance	11 Hour	12 Hour	12 Hour	12 Hour	23 Hour[1]	24 Hour[1]
1	28ft	**0.40**	**0.50**	0.072	0.12	**0.45**	**0.29**
2	32ft	0.17	0.39	0.011	0.11	0.29	0.20
3	30ft	0.20(89%)	0.48	0.041(72%)	**0.23**	0.35	0.26
4	30ft	0.14	0.30	0.056	0.14	0.23	0.18
5	33ft	0.27	0.23	**0.082**	0.088	0.25	0.16
6	34ft	0.25	0.062	0.029(63%)	0.014	0.15	0.046
7	31ft	0.32	0.20	0.058	ND(65%)	0.26	0.13
8	36ft	0.21	0.21	0.049	0.023	0.21	0.13
9	98ft	0.23	0.31	0.025	0.074	0.27	0.17
10	101ft	0.27	0.42	0.021	0.23	0.35	0.22
11	100ft	0.13	0.29	0.029	0.16	0.21	0.16
12	101ft	0.093	0.063	0.011	0.014	0.078	0.037
13	103ft	0.20	0.10	ND	0.016	0.15	0.052[2]
14	119ft	0.096	0.12	0.025	0.018	0.11	0.074
15	165ft	0.083	0.16	0.018	0.036	0.12	0.088

(%) Percentage of interval sampled is given for truncated sample periods, due to pump/battery failure during sampling interval.

[1] A two interval time weighted average concentration.

[2] indicates that the 24-hour average includes a period of no detectable amount, 0.0025ppm was used to obtain the 24-hour average.

ND = No detectable amount; reporting limit = 0.005 ppm

Bolded values are the highest concentrations for each column.

Figure 1. The application site, sampler positions, and the 23-hour time weighted average concentration (parts per million) and wind rose diagram for intervals 1& 2.